Draftsperson. No new matter is added and entry of the formal drawings is respectfully requested.

I. 35 U.S.C. § 102, Anticipation

The examiner has rejected claims 1, 2, 21 and 22 under 35 U.S.C. § 102(b) as being anticipated by Roth et al. (4,958,245). This rejection is respectfully traversed.

With regard to claims 1, 2, 21 and 22 the Office Action states:

Roth et al. teaches a compact optical tracking system for a magnetic tape including a magnetic head (15) positioning actuator (abstract) an optical servo module comprising an optical beam source (12), a detector ((34,,46, 50) and an optical beam interference composition (20) that satisfies the claimed limitations set forth in claim 1. The limitations of claim 2 are satisfied by elements (52). Claim 21 sets forth limitations similar to those discussed above and therefore rejected for similar reasons. Claim 22 sets forth that the servo module is affixed to the side of the head. This feature is taught by the arrangement shown in figure 1 of Roth et al.

Claim 1 is reproduced below:

1. A compact optical tracking system for magnetic tape, comprising:

a magnetic head assembly;

a positioning actuator for changing the position of the magnetic head assembly; and

an optical servo module structure for outputting a position signal to the positioning actuator, causing the positioning actuator to change a position of the magnetic head assembly, wherein the optical servo module structure comprises at least one optical servo module, comprising:

an optical beam source for emitting an optical beam;

a detector for detecting an optical beam reflection; and

an optical beam interference composition for interfering with the optical beam and producing a predetermined pattern on a target.

The Examiner states that Figure 1 of Roth shows the claimed limitation of an "interference composition" as claimed in at least Claim 1. The Examiner points to element 20 of Figure 1, which the specification describes as "an aperture 20 cut in the assembly 14." this figure is reproduced below.

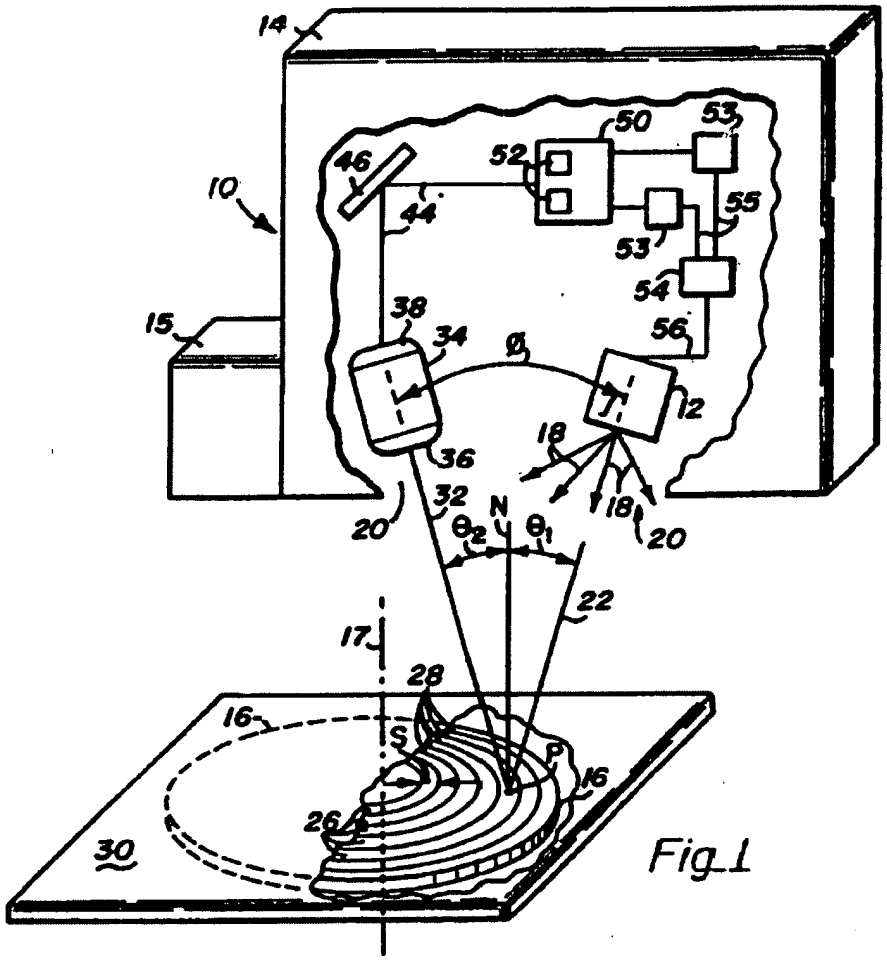

Fig 1

It is respectfully asserted that a simple aperture 20 as described in Roth and shown in the above figure is not an interference composition. An interference composition is a device (for example, a multiple slit aperture or a holographic optical element a.k.a. HOE) that causes coherent light waves incident upon it to be superimposed, usually on some other incident surface. For example, a HOE mimicking a double slit aperture will cause incident light passing through the two "slits" to be

superimposed on a later surface, which causes an interference pattern on that later surface. The present application's specification states at page 3, ll. 14-16:

> Each group of spots is a fringe pattern produced by the interference of light from a double slit mask or hologram illuminated by a laser.

Though a single aperture, if small enough, can create a noticeable diffraction pattern (which is also a superposition of light waves), this function is not mentioned and is apparently not the purpose of aperture 20 of Roth. As shown in the drawings and described in the specification, this aperture 20 appears to be quite large compared to apertures that create diffraction (e.g., both the emitted and reflected beams pass through this same aperture, at different locations). Given that both the exiting and returning beam use aperture 20, as stated in Ross, if the aperture were in fact an interference causing aperture, then the returning beam 32 of Ross would also experience interference when it reached the aperture. This would apparently serve no function in Ross and would be detrimental to the detection and processing of the information contained in that returning beam 32.

More importantly, no mention of interference or superposition of the light beams caused by the aperture is found in the Examiner's cited passages, nor in any other part of Roth. Therefore it is respectfully asserted that the aperture 20 of Roth is not an "interference composition" as claimed in at least Claim 1.

It is further asserted that Roth teaches away from the use of an interference composition. Using an aperture large enough to accommodate both the exiting and returning beams is inconsistent with that same aperture producing interference. Likewise, the sheer size of the aperture, as apparent from Figure 1 of Roth, teaches away from that aperture being an interference composition.

Roth appears to function without the need for an interference pattern. The reflected beam will have a different intensity (as detected) depending on the reflectivity of the reflecting surface, as Roth states in several places. For example, at col.5, ll. 58-60, Roth states: "A plurality of reflective areas 26 and a plurality of nonreflective areas 28 are located on the surface of medium 16." And at col. 6, ll. 10-13: "The reflective areas

26 are the plurality of spaces (land areas) that exist between the nonreflective areas 28 and are capable of reflecting more light than the nonreflective areas 28."

The intensity of reflected light depends on the reflectivity of the reflecting surface. This difference in intensity is detected, indicating what surface the beam reflected from, in turn indicating the alignment of the beam relative to the servo tracks. *See* Roth at col.6, ll. 23-49, with selected parts reproduced below (note omission of some passages indicated by ellipses):

> In Fig 1, light from the rays 18 is reflected off the reflective areas 26, as a reflected beam 32, at an angle theta2 relative to line N. . . . <u>The beam 32 passes back through the aperture 20</u> and onto a collection lens 34 located in close physical proximity to the light source 12. . . .A beam 44 emerges from the collection lens 34 and is directed to a routing mirror 46 which directs the beam 44 to a photodetector 50. The photodetector 50 has two or more photodiode cells 52, having identical shapes for converting light energy to electrical current. The amount of current produced is proportional to the light power impinging on each of the cells 52. [Emphasis added.]

Thus Roth appears to practice tape alignment without the need for an interference composition or interference of any kind. Note also the underlined passage, indicating that aperture 20 is large enough to accommodate both the exiting beam and the returning reflected beam, which are separated by an angle theta1 plus theta2. Such an aperture cannot produce appreciable or useful superposition of light waves, and is apparently only used in Roth to allow passage of the light two and from the assembly 14.

Roth apparently detects alignment by measuring the intensity of only a single reflected beam, which indicates the reflectivity of the reflecting surface (i.e., reflective surface 16 or nonreflective surface 18), which in turn indicates the alignment. Applicant can find no mention of interference or an interference composition in the cited passages of Roth, nor in any other part of Roth. If Applicant has overlooked a relevant teaching, it is respectfully requested that such teaching be pointed out with particularity.

Therefore it is respectfully asserted that Roth does not teach all claimed limitations of Claim 1, particularly the limitation "an optical beam interference composition for interfering with the optical beam and producing a predetermined pattern on a target."

Since dependent Claim 2 depends from independent Claim 1, the same distinctions between Roth and Claim 1 are believed to apply to Claim 2. Likewise, Claims 21 and 22 contain the same limitation as Claim 1, namely "an optical beam interference composition for interfering with the optical beam and producing a predetermined pattern on a target." This limitation is distinguishable from Roth for the same reasons as argued for Claim 1.

Therefore, the rejection of Claims 1, 2, 21, and 22 under 35 U.S.C. § 102 has been overcome.

II. 35 U.S.C. § 103, Obviousness

The examiner has rejected claims 3-7, 18-20, and 23 under 35 U.S.C. § 103(a) as being unpatentable over Roth et al. in view of other references This rejection is respectfully traversed.

The Examiner rejects Claims 3-7, 18-20, and 23. With regard to Claim 20, the Office Action states:

> Claims 4, 5, 18 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Roth et al. as applied to claims 1 and 2 above, and further in view of Smith (6,275,349).
>
> The teaching of Roth et al. is discussed above and incorporated herein. Claim 4 further sets forth plural modules. Although not taught by Roth et al., is taught by Smith (figure 2 and 3) to improve the accuracy of placement of the head. It would have been obvious to one of ordinary skill in the art to incorporate such a teaching in Roth et al. for the purpose, i.e. to improve the accuracy of the head placement. The placement of these modules set forth in claim 5 is satisfied by Smith and Roth et al. The limitations of claim 18 are satisfied by Roth et al. (column 5). The two or more slits, claim 20 are deemed inherent in Roth et al. (figure 1).

The rejection of Claims 3-7, 18-20, and 23 are based on the application of Roth to these claims in view of other cited references. Claims 3-7, 18-20 ultimately depend from Claim 1, which has been argued above. It is respectfully asserted that the arguments in

favor of Claim 1 also apply to Claims 3-7, 18-20, and that they are therefore patentable. Likewise, Claim 23 depends from Claim 21, which has also already been argued (above).

Regarding the specific rejection of Claim 20, based on Roth in view of Smith, the Examiner states that two or more slits are inherent in Ross. However, it is respectfully pointed out that the aperture 20 in Ross does not appear to be one capable of causing interference, as interference is nowhere mentioned in Ross with respect to the aperture 20. There also appears to be no mention of there being "two or more parallel slits" anywhere in Ross.

Furthermore, it is respectfully asserted that the Examiner has misapplied the concept of "inherent" anticipation. Section 102 of Title 35 deals with novelty and loss of patent rights. An invention is said to be "anticipated" when it is squarely described or disclosed in a single reference as identified from one of the categories of 35 U.S.C. § 102, commonly referred to as "prior art". Express anticipation occurs when the invention is expressly disclosed in the prior art, patent or publication. In some cases, however, when the claimed invention is not described *in haec verba*, the "doctrine of inherency" is relied on to establish anticipation. Under the principles of inherency, a claim is anticipated if a structure in the prior art necessarily functions in accordance with the limitations of a process or method claim. *In re King*, 801 F.2d 1324, 231 U.S.P.Q. 136 (Fed. Cir. 1986). A prior art reference that discloses all of a patent's claim limitations anticipates that claim even though the reference does not expressly disclose the "inventive concept" or desirable property the patentee discovered. *Verdgaal Brothers, Inc. v. Union Oil Company of California*, 814 F.2d 628, 2 U.S.P.Q.2d 1051, (Fed. Cir. 1987). It suffices that the prior art process inherently possessed at that property. *Id.* Mere possibilities or even probabilities, however, are not enough to establish inherency. The missing claimed characteristics must be a "natural result" flowing from what is disclosed. *Continental Can Co. v. Monsant Co.*, 948 F.2d 1264, 20 U.S.P.Q.2d 1746 (Fed. Cir. 1991). Unstated elements in a reference are inherent when they exist as a "matter of scientific fact". *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 7 U.S.P.Q.2d 1057 (Fed. Cir.), *cert. denied*, 488 U.S. 892 (1988) and *Hughes Aircraft Co. v. United States*, 8 U.S.P.Q.2d 1580 (Ct. Cl. 1988). Otherwise, the invention is not inherently anticipated.

In the present case, the examiner's assertion that these elements are present can be made only through the use of the applicants' disclosure as a template to fill in the missing elements. There is no mention of multiple slits in Roth, and in fact Roth would not function as described if the aperture were an interfering aperture with multiple slits as the Examiner asserts, because the returning beam 32 of Roth would then also experience interference when it reached the aperture on its way to the gathering lens and detector. Such interference would necessarily divide the beam into multiple intensity spots or patters (a necessary result of interference), and such division is apparently not mentioned or shown in Roth.

It is therefore respectfully urged that Claim 20 is patentable over the cited references.

Therefore, the rejection of claims under 35 U.S.C. § 103 has been overcome.

III. Objection to Claims

The examiner has stated that claims 8-17 were objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. In response, the claims have been rewritten to overcome this objection.

Conclusion

The Examiner is thanked for the allowance of Claims 8-17. It is respectfully urged that the remaining claims of the subject application are patentable over the cited references and the application is now in condition for allowance.

The examiner is invited to call the undersigned at the below-listed telephone number if in the opinion of the examiner such a telephone conference would expedite or aid the prosecution and examination of this application.

DATE: 7.9.02

Respectfully submitted,

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REDACTED CLAIMS

8. (ONCE AMENDED) [The compact optical tracking system recited in claim 7,] A compact optical tracking system for magnetic tape, comprising:

a magnetic head assembly;

a positioning actuator for changing the position of the magnetic head assembly; and

an optical servo module structure for outputting a position signal to the positioning actuator, causing the positioning actuator to change a position of the magnetic head assembly, wherein the optical servo module structure comprises at least one optical servo module, comprising:

an optical beam source for emitting an optical beam;

a detector for detecting an optical beam reflection; and

an optical beam interference composition for interfering with the optical beam and producing a predetermined pattern on a target;

wherein each optical servo module contains at least a first and second detector for detecting an optical beam reflection;

wherein the optical servo module structure comprises a plurality of optical servo modules;

further comprising a yoke assembly, wherein the optical servo module structure is affixed to a yoke assembly, and the optical servo module structure faces a back side of the magnetic tape;

further comprising a grating assembly, wherein the grating assembly comprises at least one reference grating used as a target for the predetermined pattern emitted from the optical source within the optical servo module;

further comprising an outboard reference grating on the grating assembly, wherein the outboard reference grating is affixed to the grating assembly past the extent of the magnetic tape; and

an outboard servo module, wherein the predetermined pattern emitted from the optical source within the outboard servo module uses the outboard reference grating as a target.